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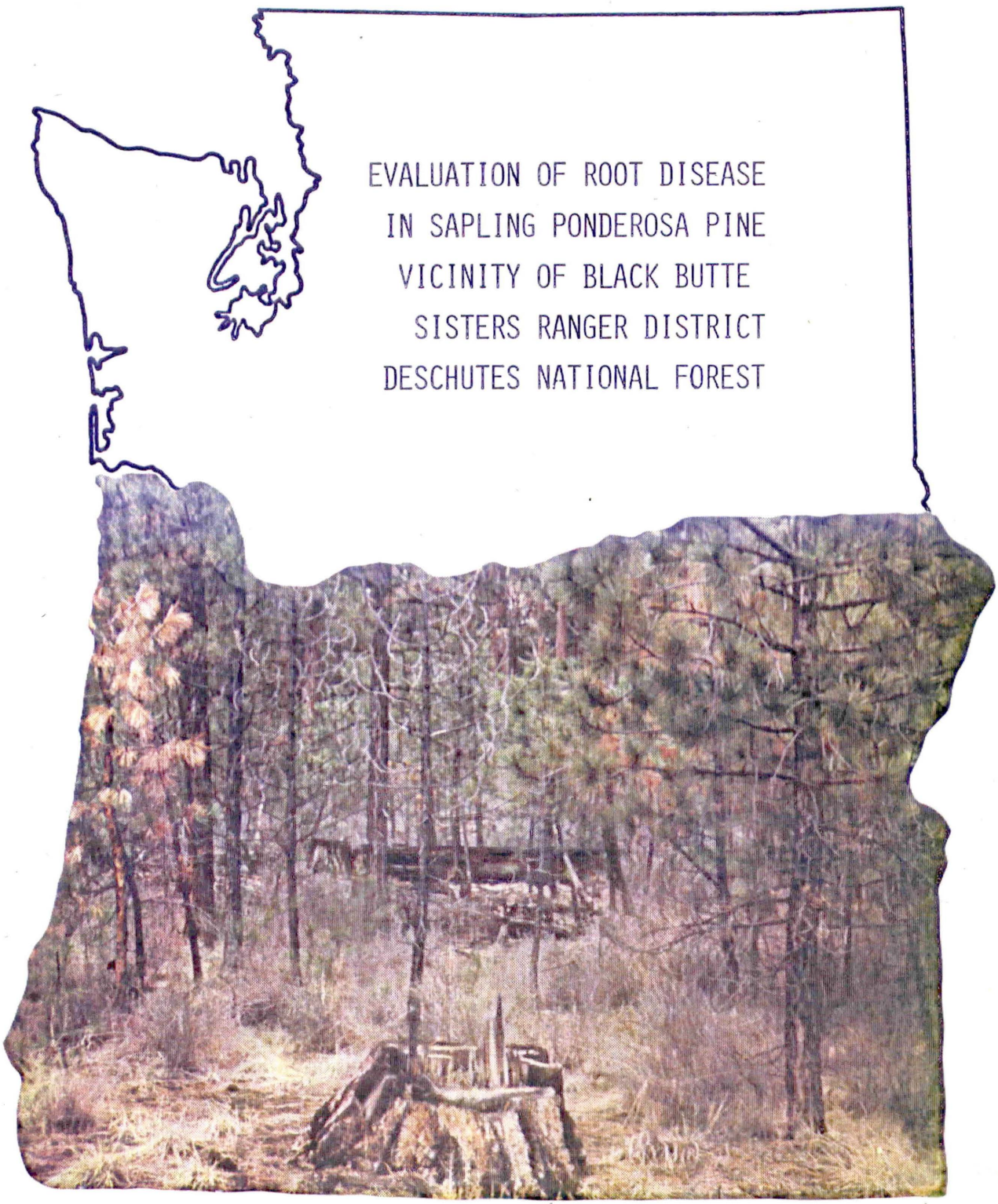

EVALUATION OF ROOT DISEASE IN SAPLING PONDEROSA PINE IN THE VICINITY OF BLACK BUTTE, SISTERS RANGER DISTRICT, DESCHUTES NATIONAL FOREST

By

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Appreciation is extended to Scott Worrell and Frank O'Hare for data collection

In October 1979, Forest Insect and Disease Management pathologists conducted a survey of root diseases in sapling ponderosa pine on the Sisters Ranger District, Deschutes National Forest. Purpose of the survey was to determine the incidence of sapling mortality caused by root diseases in the area adjacent to Highway 20 near its intersection with the Camp Sherman Road (Figure 1).

METHODS

A series of survey lines 10 chains long and 5 chains apart were run perpendicular to the Camp Sherman Road and Highway 20. Fixed area (1/100 acre) circular plots were established every chain along these survey lines. The number of trees $\geq$6 in. in height within each plot were recorded. For dead and dying trees, DBH (or height if less than 1 in. DBH) and cause of death were recorded. Distances from dead saplings to the closest old-growth stumps were measured.

The presence of root diseases was determined by uprooting the entire tree (if possible), and examining the root collar for sporophores of *Fomes annosus* or removing the bark and noting mycelial fans of *Armillaria mellea* or black stain caused by *Ceratocystis wageneri* in the wood. Root samples were collected from each dead and dying tree and returned to the laboratory where isolations were made from split root sections onto agar media to isolate and identify root pathogens.

RESULTS

Of 399 plots examined, 327 (82%) were healthy (no dead saplings), 16 (4%) had at least one sapling killed by root diseases, 16 (4%) had at least one sapling killed by unknown causes (probably suppression or insects), and 40 (10%) were nonstocked.

Of 1,135 ponderosa pine saplings per acre under 5 in. DBH, 99.1 percent were healthy, 0.4 percent were killed by root diseases, and 0.5 percent were killed by unknown causes. *Armillaria mellea* was the principal root pathogen, although one dead seedling was infected by *Fomes annosus* and one dead sapling by *Ceratocystis wageneri*.

Trees infected and killed by root diseases were closer to old-growth stumps than trees killed by unknown causes (a mean of 32.1 ft. versus 39.1 ft.).

DISCUSSION AND RECOMMENDATIONS

With an understory stocking of 1,135 saplings per acre, what little mortality is being caused by root diseases and unknown causes may be considered inconsequential at this point in time. Sapling mortality was not clumped in any one location, but appeared to be scattered throughout the surveyed stand. Little or no mortality attributable to root diseases was observed in the overstory. Root diseases in saplings usually are associated with infected old-growth stumps of the former overstory (Shaw et al 1976, Filip 1977). Depending on their size, these stumps can harbor root disease fungi for 50 or more years. Susceptible saplings become infected when they contact infected stumps or infected lateral roots of stumps. Hence, the closer that saplings are located near infected stumps, the greater the chance that they will become infected. In cases of lightly stocked stands or stands with an understory of a more disease-susceptible species such as grand fir, losses due to root diseases can be more serious where old-growth stumps serve as an inoculum source for root diseases (Filip 1980). However, in the situation we examined where the understory is overstocked with ponderosa pine, sapling mortality may be looked upon as a gain rather than a loss.

Based upon our observations and the fact that the area surveyed serves as a visual corridor along the highways, we recommend that nothing be done to reduce the future mortality losses in the understory we examined. Periodic monitoring will determine if mortality rates are becoming unacceptable. Thinning of the understory, whether natural or otherwise, should be beneficial to the overstory of old-growth ponderosa pine as well as to the saplings.

Forest Insect and Disease Management pathologists are available to do additional surveys at the request of the District.

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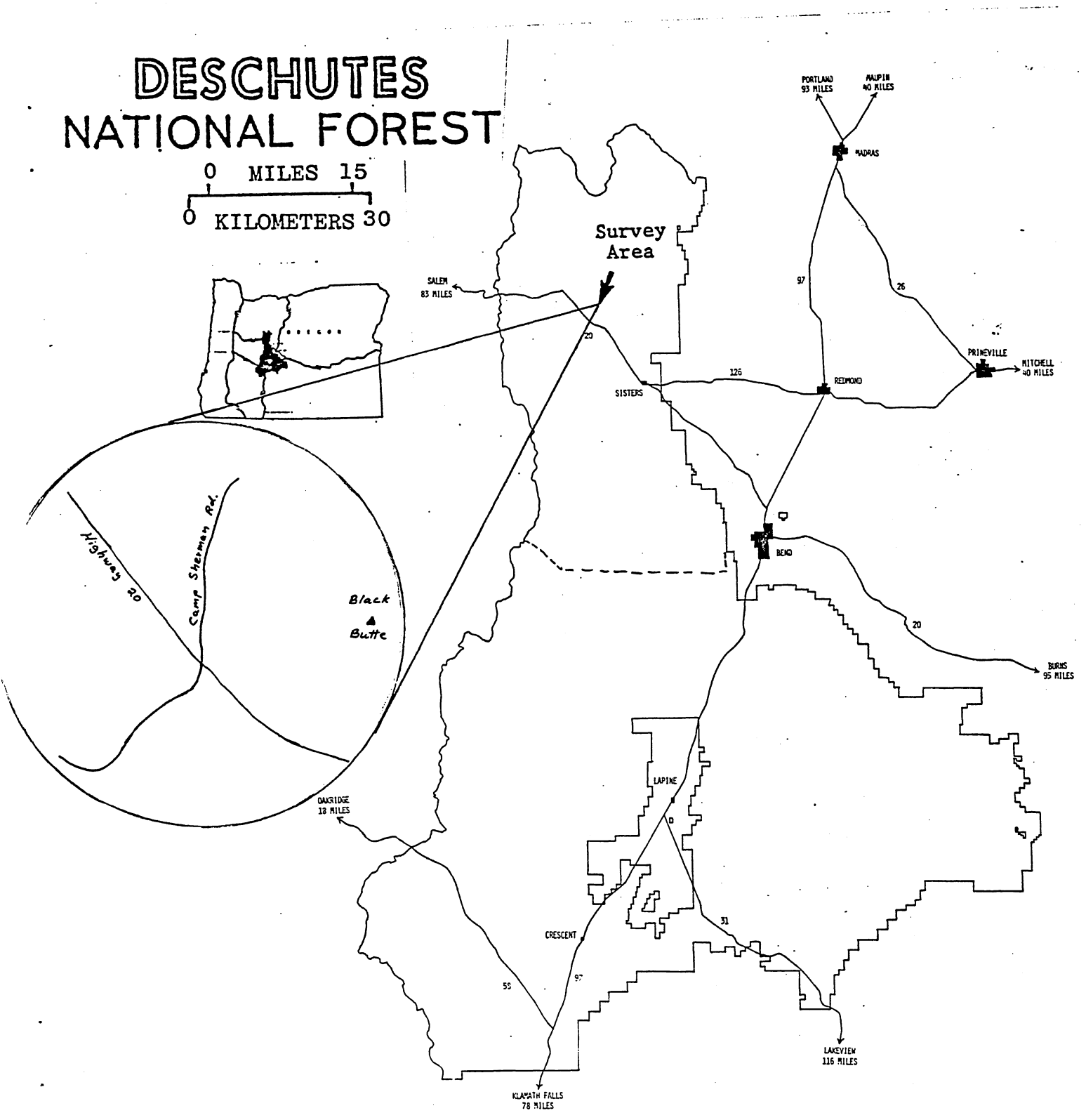

Fig.1--Map depicting location of survey area. Dotted line depicts southern boundary of the Sisters Ranger District.